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Ali Kaan Kalkan

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Douglas L. Wathen  
GIFFORD, KRASS, SPRINKLE,  
ANDERSON & CITKOWSKI, P.C.  
2701 Troy Center Drive, Suite 330; P.O. Box 7021  
Troy, MI 48007-7021

EXAMINER

LANGMAN, JONATHAN C

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**ADVISORY ACTION**

***Response to Arguments***

112

Claims 105 and 107-110 were rejected for not having support in the specification. The limitation in question is "wherein a single nanocrystal of said plurality of metallic nanocrystals bridges two spatially separated adjacent columns". In the affidavit, the applicant points to Figure 6, which shows a roughly 80 nm sized nanocrystal and as the applicant asserts on page 3 of the remarks "must necessarily span at least two columns". However, the nanocolumns are not visible underneath the nanoclusters, so it is unclear if these nanoparticles actually "bridge", which the examiner contends to mean be in contact with two nanocolumns. Furthermore, the applicant asserts that the size and spacing of the nanocolumns in figure 6 are both 20 nanometers. However it is unclear to the examiner where these spacings and diameters come from. The examiner does not see in the specification where the applicant defines the spacing and diameters of the nanocolumns in Figure 6. Therefore the 112 1st rejections over 105 and 107-110 are maintained.

Filas

In regards to the rejections involving Filas as the primary reference, the applicant asserts in the remarks and in the affidavit both filed December 28, 2009, that the magnetic coatings between the nanoparticles and nanorods, as well as the agglomeration of the nanoparticles, taught by Filas, renders the nanoparticles inadequate to exhibit surface plasmon resonance. The rejections set forth by the

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examiner, were based solely on the inherency of surface plasmon resonance in the nanocrystals of Filas, and the applicant has persuasively argued that the nanocrystals of Filas will not exhibit surface plasmon resonance, and therefore the rejections over Filas are removed.

Debe

On page 8 of the remarks, applicant argues that the finding that Figure 2 b of Debe shows uniform covering of isolated nanocrystals of platinum is in direct contradiction to the statements found in Debe at column 14, lines 11-37 that specifically recite that the coatings are conformal and with non uniform distribution along the lengths of the microstructures indicating a greater coating density at the top relative to the bases. The applicant asserts that this teaching thus does not show uniformly dispersed metal nanoparticles.

However the applicant appears to be arguing a more narrow definition than they are entitled to. Claim 99 sets forth that “a plurality of metallic nanocrystals spaced uniformly between columns...”. Thus the claim limitation only sets forth that at least two (a plurality) of nanocrystals are uniformly spaced. Therefore Figure 2 b can be relied upon, even if it does not show the base of the nanocolumn, since Figure 2 b does show at least two ( a plurality) nanoparticles spaced apart. The claims do not set forth that all nanocrystals are uniformly spaced, and therefore the rejections in view of Debe are still deemed proper.

Sun and Zhang

The applicant asserts on page 10 of the remarks, that the various surfaces of single crystal silicon are well known to have different surface energies and growth kinetics resulting in metal nanocrystals preferentially populating certain facets of the single crystal nanowire relative to other faces. These differential metal nanoparticle growth rates based on the various energy faces of a single crystal silicon nanowire according to the prior art reference combination teach away from the claimed invention with respect to a "plurality of metallic nanoparticles spaced uniformly between columns of said array of nanostructured silicon nanocolumns".

The Examiner disagrees. Preferential populated nanocrystals will still be spaced apart to some degree. As mentioned above, in the response to Debe, the claims only set forth that at least two nanocrystals are spaced uniformly apart. The preferential distribution of nanocrystals based on single crystal nanowire facets does not distinguish from the instantly claimed plurality of nanocrystals uniformly spaced. The claim limitations only set forth that at least two nanocrystals must be uniformly spaced, and it is the examiner's position that preferential distribution of nanocrystals will result in at least two nanocrystals uniformly spaced between the nanocolumns.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN C. LANGMAN whose telephone number is (571)272-4811. The examiner can normally be reached on Mon-Thurs 8:00 am - 6:30 pm EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCL

/Timothy M. Speer/  
Primary Examiner, Art Unit 1794